

CLAIMS

1. A light source device comprising:
at least two coherent light sources; and
a diffraction part for diffracting light which is emitted from at least one of the coherent light sources so that the respective lights emitted from the at least two coherent light sources propagate through the same optical path.
2. A light source device as defined in Claim 1 wherein the optical propagation paths of the respective lights emitted from the at least two coherent light sources overlap each other on the diffraction part.
3. A light source device as defined in Claim 1 wherein the center axes of the optical propagation paths of the respective lights emitted from the at least two coherent light sources intersect at one point on the diffraction part.
4. A light source device as defined in Claim 1 wherein the at least two coherent light sources are disposed on the same submount.
5. A light source device as defined in Claim 1 wherein said coherent light sources are a coherent light source that emits red

light, a coherent light source that emits blue light, and a coherent light source that emits green light.

6. A light source device as defined in Claim 1 wherein the light emitted from at least one coherent light source among the coherent light sources passes through the diffraction part without being diffracted by the diffraction part.

7. A light source device as defined in Claim 1 wherein
said diffraction part comprises a single diffraction element,
and

said diffraction element diffracts the light emitted from at least one coherent light source so that the respective lights emitted from the at least two coherent light sources propagate through the same optical path.

8. A light source device as defined in Claim 7 wherein said diffraction element is further provided with a lens function.

9. A light source device as defined in Claim 1 wherein said diffraction part comprises:

a first diffraction element for receiving at least two lights, and diffracting at least one of the received lights so that the received at least two lights propagate through the same optical path; and

a second diffraction element for diffracting the light emitted from at least one coherent light source among the at least two coherent light sources so that the center axes of the optical propagation paths of the lights emitted from the respective coherent light sources intersect at one point on the first diffraction element.

10. A light source device as defined in Claim 9 wherein said second diffraction element is further provided with a lens function, and

said second diffraction element condenses the respective lights emitted from the at least two coherent light sources so that the respective lights diffracted by the second diffraction element irradiate the same region of the first diffraction element.

11. A light source device as defined in Claim 7 or 9 wherein said diffraction element is a volume hologram, and

plural gratings are multiplexed on the volume hologram, which gratings receive the respective lights emitted from the at least two coherent light sources, and change the propagation directions of the respective lights.

12. A light source device as defined in Claim 7 wherein said diffraction element is regionally divided, and

the respective lights that are diffracted in the divided regions of the diffraction element irradiate the same planar region.

13. A light source device as defined in Claim 9 wherein said first diffraction element is regionally divided, and the respective lights that are diffracted in the divided regions of the first diffraction element irradiate the same planar region.

14. A light source device as defined in Claim 12 or 13 wherein said diffraction element is regionally divided in a lattice pattern.

15. A two-dimensional image display device comprising:

at least two coherent light sources;

a diffraction part for diffracting light emitted from at least one coherent light source so that the respective lights emitted from the at least two coherent light sources propagate in the same optical path; and

a two-dimensional spatial light modulation element for receiving the respective lights that are diffracted by the diffraction part to be coaxial beams, said element being provided in a space above the diffraction part.

16. A two-dimensional image display device as defined in Claim
15 further including:

a control part for controlling the operations of the at least
two coherent light sources; and

said at least two coherent light sources being a coherent
light source that emits red light, a coherent light source that
emits green light, and a coherent light source that emits blue
light; and

said control part controlling the three coherent light
sources so that the coherent light sources are time-shared to
sequentially emit lights.